Relation between ionization of the...

31667
S/570/61/000/019/007/008
B107/B104

$K = a + A \cdot \sin Z$; $\Delta foF2 = b + B \cdot \sin Z$. A and B change linearly with the relative number W of sunspots. a and b also increase somewhat as W increases. Table 1 gives the graphically determined values for measurements of the Yuzhno-Sakhalinsk station. Deviation is low in observations made by the stations Alma-Ata, Simferopol', and Yuzhno-Sakhalinsk, somewhat greater with Rostov-na-Donu. The reason might be that up to 1958 a hand-operated ion probe was used in Rostov which did not allow exact measurements of the daily foF2 due to the limited frequency range. Result: The linear relation between foF2 and $\sin Z$, found by Likhachev, holds for middle latitudes, at least for $40 - 50^\circ$ north latitude; the formula is preferably set up in two terms. The coefficients are proportional to the solar activity. Checking and physical interpretation of this rule with the aid of data obtained by stations at different latitudes would be of great interest. The relation is hardly suitable for the practical calculation of the daily foF2 variation. There are 2 figures, 1 table, and 1 Soviet reference.

Card 2/3

KONNOVA, R.V.

Regularities of the E-layer over southern Sakhalin. Geomag.i
aer. 2 no.6:1146-1147 N-D '62.
(MIRA 16:1)

Institut zemnogo magnetizma, ionosfery i rasprostraneniya
radiovoln AN SSSR.
(Sakhalin—Sporadic E (Ionosphere))

PUDOVIK, A.N.; MURATOVA, A.A.; KONNOVA, T.I.; FEOKTISTOVA, T.; LEVKOVA, L.N.

Reactions of esters of alkyl phosphonic acids with halogen-containing compounds. Zhur.ob.khim. 30 no.8:2624-2630 Ag '60.

(MIRA 13:8)

1. Kazanskiy gosudarstvenny universitet.
(Phosphonic acid)

BOLYSHEV, N.N.; BYKOVA, L.N.; KONNOVA, Ye.N.

Dynamics of readily soluble salts in the complex soils of the chestnut zone in the Stalingrad-Stepnoye region. Vest.Mosk.un. 8 no.5:101-114 My '53.
(MLRA 6:8)

1. Kafedra pochvovedeniya.
     (Stalingrad region—Soils) (Soils—Stalingrad region)
     (Stepnoye region—Soils) (Soils—Stepnoye region) (Salts, Soluble)

BOLYSHEV, N.N.; SHTINA, E.A.; KONNOVA, Ye.N.

    Effect of various salts and their concentrations on algal species.
Vest.Mosk. un. Ser. 6: Biol., pochv. 20 no.2:72-80 Mr-Ap '65.

                                    (MIRA 18:5)

1. Kafedra pochvovedeniya Moskovskogo universiteta.

AUTHORS:

Kost, A. N., Konnova, Yu. V.,
Yershov, V. V., Rukhadze, Ye. G.   SOV/79-29-2-29/71

TITLE:

Reactions of Hydrazine Derivatives (Reaktsii proizvodnykh
gidrazina). XXII. 3-Amino-1-aryl Pyrazolines and Their
Salicylal Derivatives (XXII. 3-Amino-1-arilpirazoliny i ikh
salitsilal'nyye proizvodnyye)

PERIODICAL:

ABSTRACT:

It was demonstrated that 3-amino-1-phenyl pyrazoline (I),
which was synthesized by the authors already earlier, disposes,
like some other hydrazine derivatives, of a bactericidal
activity, that is to say, it inhibits the growth of the
bacilli of human tuberculosis. For this reason the authors
synthesized according to Duffin and Kendall (Ref 2) several
3-amino-1-phenyl pyrazolines by reaction of α,β-unsaturated
nitriles with aryl hydrazines according to the scheme
mentioned. On the basis of some reactions the affiliation
of the unsaturated nitrile apparently takes place in the
first stage of reaction, while cyclization occurs afterwards.

Card 1/3

Reactions of Hydrazine Derivatives. XXII. 3-Amino-1-aryl   SOV/79-29-2-29/71
Pyrazolines and Their Salicylal Derivatives

Only small amounts of unstable aminopyrazolines resulted
from the synthesis of Duffin and Kendall (Ref 2), which was
carried out strictly according to specifications. Hence it
follows that it is more favorable not to carry out the
reaction in ethyl alcohol but in the higher boiling butyl
alcohol. Accordingly, sodium butylate instead of sodium
ethylate was used as catalyst. These modifications of reaction
permitted an increase in the yield of aminopyrazolines by
20-40% (50-80% of the theoretical one): 3-amino-1-n-tolyl
pyrazoline (VI) was obtained by reaction of β-dimethyl-amino
propionitrile with n-tolyl hydrazine. The most intense acti-
vity against bacilli was exhibited by 1-phenyl-3-aminopyra-
zoline (I). The 3-aminopyrazolines synthesized readily enter
reaction with salicyl-5-bromo salicyl aldehyde and 2-oxy
naphthoic aldehyde under formation of bright-colored salicyl
amines. Their absorption spectra are given in the figure.
Almost all salicyl aminopyrazolines offer precipitations or
a green coloration with salts of trivalent iron; many of them
produce characteristic precipitations with the salts

Card 2/3

Reactions of Hydrazine Derivatives. XXII. 3-Amino-1-aryl   SOV/79-29-2-29/71
Pyrazolines and Their Salicylal Derivatives

Cu^{+2}, Ni^{+2}, Co^{+2}, Zn^{+2}, Pb^{+2}, Be^{+2}. There are 3 figures
and 6 references, 3 of which are Soviet.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet (Moscow State Uni-
versity)

SUBMITTED: December 16, 1957

Card 3/3

S/079/...

5OV/79-30-2-2/78

AUTHORS: Shemyakin, M. M., Arbuzov, Yu., Kolosov, M. N., Onoprienko, V. V., Konnova, Yu. V.

TITLE: Investigation in the Field of Tetracyclines. VI. Carboxy-imidation of Dimedone With Isocyanates
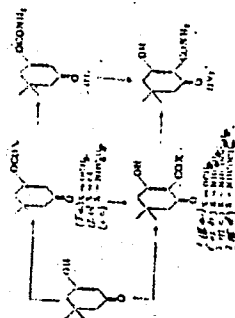
PERIODICAL: Zhurnal obshchey khimii, 1940, Vol 30, Nr 2, pp 542-545 (USSR)

ABSTRACT: Carboxy-imidation of dimedone with carbonic acid derivatives was done by one of the following variants. There are 5 references, 3 Soviet, 1 German, 1 U.S. reference, (Ref. R. L. Frank, H. K. Hall, J. Am. Chem. Soc., 72, 164, (1950).

ASSOCIATION: Institute of Organic Chemistry, Academy of Sciences, USSR (Institut organicheskoy khimii Akademii nauk SSSR)

SUBMITTED: February 25, 1959

Card 1/3

Card 2/3

Some Properties of Obtained Products

Nr	Starting material	Obtained product	Yield in %	bp/mm	n_D^{20}
1	Na-enolate of dimedone (I) + dry ether + chloroformic acid	Ia	76	bp 125–122/4	1.4784
2	I + phosgene	3-chloro-5,5-dime-thylcyclohex-2-en-1-one	75	75/7	1.4955
3	I + phenyl isocyanate + dimethylformamide	IIIb	75	mp 92– 93	
4	I + carbethoxy cyanate	IIIc	94	mp 65– 66	
5	IIId + NH$_4$OH + CH$_3$OH	IV	97		

Card 3/3

L 37208-66   EWT(m)/EWP(j)   JW/RM

ACC NR: AP6014413

SOURCE CODE: UR/0062/66/000/004/0753/0755

AUTHOR: Novikov, S. S.; Ivanova, I. S.; Bogdanova, G. F.; Alekseyeva, T. A.; Konnova, Yu. V.

ORG: Institute of Organic Chemistry im. N. S. Zelinakiy Academy of Sciences SSSR (Institut organicheskoy khimii, Akademii nauk SSSR)

TITLE: Synthesis and certain chemical conversions of nitro- and nitrazadicarboxylic acids

SOURCE: AN SSSR. Izvestiya. Seriya khimicheskaya, no. 4, 1966, 753-755

TOPIC TAGS: organic nitro compound, aliphatic carboxylic acid, chemical reaction, dissociation constant, heat resistance

ABSTRACT: γ-nitro- and γ-nitro-γ-methylpimelic acid were synthesized from methyl acrylate and nitromethane (nitroethane). The dihydrazides and the dichloroanhydrides were prepared. Introduction of the nitro groups in the γ-position of pimelic acids reduced their thermal stability. Dissociation constants determined by potentiometric titration showed that introduction of 1 or 2 nitro groups in the γ-position of pimelic acid increased acid strength. Acid strength increases in the following

Card 1/2

UDC: 542.91 547.232

L 37208-66

ACC NR: AP6014413

series: pimelic, γ-nitro- γ-methylpimelic, γ-nitropimelic, 3-nitrazapentane dicarboxylic acid-1,5, and γ, γ-dinitropimelic. Orig. art. has: 1 table and 2 equations.

SUB CODE: 07/ SUBM DATE: 25Aug65/ ORIG REF: 002/ OTH REF: 003

Card 2/2 mcp

IVANOVA (Korsakova), I.S.; KOMLOVA, Yu.V.; NOVIKOV, S.S.

Addition of ethylenedinitrodiamine to nitroalkenes. Izv. AN SSSR.
Otd.khim.nauk no.5:920-921 My '62.
(MIRA 15:6)

1. Institut organicheskoy khimii im. N.D.Zelinskogo AN SSSR.
(Ethylenediamine)   (Olefins)

IVANOVA, I.S.; KONNOVA, Yu.V.; NOVIKOV, S.S.

Syntehses of methyl ester of α-nitrocrotonic acid. Isv.AN SSSR.Otd.khim.
nauk no.9:1677-1679 S '62. (MIRA 15:10)

1. Institut organicheskoy khimii im. N.D.Zelinskogo AN SSSR.
(Chrotonic acid)

IVANOVA, I.S.; KONNOVA, Yu.V.; BULATOVA, N.M.; NOVIKOV, S.S.

Addition of 3,3,5,5-tetranitropiperidine to α, β -unsaturated compounds.
Izv.AN SSSR.Otd.khim.nauk no.9:1686-1688 S '62.
                                                    (MIRA 15:10)

1. Institut organicheskoy khimii ii. N.D.Zelinskogo AN SSSR.
       (Piperidine)   (Unsaturated compounds)

IVANOVA, I... KOMOVA, Iu.V.; NOVIKOV, S.S.

Addition of hem-dinitroalkanes to unsaturated nitro compounds.
Izv.AN SSSR. Otd.khim.nauk no.11:2078-2079 N '62.

(MIRA 15:12)

1. Institut organicheskoy khimii im. N.D. Zelinskogo AN SSSR.
(Nitro compounds)   (Unsaturated compounds)

KONNOVA, Z.S., mladshiy nauchnyy sotrudnik

Method for isolating pure cultures of Vibrio fetus. Veterinariia
41 no.7:101   Jl '64.   (MIRA 18:11)

1. Vsesoyuznyy institut eksperimental'noy veterinarii.

VOLOSKOV, P.A., prof.; KONNOVA, Z.S., mladshiy nauchnyy sotrudnik

Method for isolating pure cultures of Vibrio fetus. Veterinariia
41 no.1:78 Ja '65.
(MIRA 18:2)

1. Vsesoyuznyy institut eksperimental'noy veterinarii.

BEREZOV, Yu.Ye.; POTEMKINA, Ye.V.; MILONOV, B.V.; FRIDMAN, E.G.; KONOBEVTSEV, O.F.

Possible surgical therapy of gastric stump tumors; preliminary report. Grud. Khir. 3 no.2:77-83 '61.   (MIRA 14:4)
(STOMACH—TUMORS)

42650

S/062/62/000/011/015/021
B117/B101

II. 1266

AUTHORS: Ivanova, I. S., Konnova, Yu. V., and Novikov, S. S.

TITLE: Addition of gem-dinitroalkanes to unsaturated nitro-compounds

PERIODICAL: Akademiya nauk SSSR. Izvestiya. Otdeleniye khimicheskikh
             nauk, no. 11, 1962, 2078-2079

TEXT: The nucleophilic addition of 1,1-dinitropropane, 1,1-dinitrobutane
to β,β,β-trinitroethyl acrylate was examined in order to ascertain the
reactivity of the double bond in acryl esters of nitro-alcohols. The
reaction at room temperature in methanol and in the presence of catalytic
amounts of sodium methylate resulted in the following compounds: (1) The
2,2,2-trinitroethyl ester of γ,γ-dinitrocaproic acid was obtained from
1,1-dinitropropane and 2,2,2-trinitroethyl acrylate; m.p. 53-54°C;
yield 35.1%; (2) the 2,2,2-trinitroethyl ester of γ,γ-dinitroenanthic acid
was obtained from 1,1-dinitrobutane and 2,2,2-trinitroethyl acrylate;
m.p. 69-70°C, yield 17.3%. For comparison, the same gem-dinitroalkanes
were added to 1-nitroalk-1-enes, whereby the following compounds were
obtained for the first time: (1) 1,3,3-trinitro-2-methyl pentane,

Card 1/2

Addition of gem-dinitroalkanes...

S/062/62/000/011/015/021
B117/B101

b.p. 109-110.5°C (1 mm Hg), n_D^{20} 1.4727, from 1,1-dinitropropane and 1-nitropropene-1 in a yield of 49.2%; (2) 1,3,3-trinitro-2-ethyl pentane, b.p. 130-130.2°C (2 mm Hg), n_D^{20} 1.4764, from 1,1-dinitropropane and 1-nitrobutene-1 in a yield of 75%; (3) 1,3,3-trinitro-2-n-propyl pentane, b.p. 122-123°C (1 mm Hg), n_D^{20} 1.4750, from 1,1-dinitropropane and 1-nitropentene-1 in a yield of 81.1%. The yields of the adducts obtained indicate that the double bonds in nitroalkenes are more reactive than the double bond in the esters of unsaturated acids and nitro-alcohols.

ASSOCIATION: Institut organicheskoy khimii im. N. D. Zelinskogo Akademii nauk SSSR (Institute of Organic Chemistry imeni N.D.Zelinskiy of the Academy of Sciences USSR)

SUBMITTED: June 13, 1962

Card 2/2

CHIKLEYEV, S.; PAVLOVSKIY, M. (Kemerovskaya obl.); BOCHKOV, A.; KHARITONOV, I.; ZOLOTENKOV, V. (Yakutskaya ASSR); KONOBEYEV, A. (Bazarnc-Karabulanskiy rayon, Saratovskaya obl.); VOLKOV, I.; BESEDIN, S. (Omsk); NOVIKOV, P.; GRINEV, V.; SOLOPENKOV, P.; ALEKSEYEV, K.; TOLKOV, I. (Rostovskaya obl.); KOSTENKO, P.; NOVIKOV, A.; instruktor profilaktiki (Shumerlya, Chuvashskaya ASSR)

Reader's letters. Pozh. delo 9 no.11:30-31 N '63.

(MIRA 17:1)
1. Nachal'nik pozharnoy okhrany Klinskogo kombinata, Klin, Moskovskaya obl. (for Chikleyev). 2. Vneshtatnyy pozharnyy inspektor, predsedatel' Simferopol'skogo rayonnogo komiteta Dobrovol'nogo obshchestva sodeystviya armii, aviatsii i flotu (for Alekseyev). 3. Nachal'nik otdela Gosudarstvennogo pozharnogo nadzora, Sverdlovsk (for Kostenko).

Monobeyev, B.I.

from 7 to 14
W. M. Bliraberg

Mass Exchange in Thin Liquid Films

20-4-36/52

hardly soluble gases in a filmy ("plenochnyy") current
only depends on the conditions of the formation of waves,
especially on the length of the waves λ and on their
amplitude ("amplituda"). The wave length was experimant-
ally stated means of 2 methods: 1) by direct light absorption
of the liquid current in the tube, and 2) by light absorptions
from the oscillograph. In this last case the flowing liquid
film connected a circuit that included a source of current
and a constant resistance of 50 000 ohms. The alternating
component ("peremennaya sostavlyaushchaya") of the voltage
that had arisen because of the changes of the thickness of
the liquid layer, was transferred to the entrance of the
oscillograph by the constant resistance. Table 1 shows the
results of the experimental determinations of the wave
length. Two equations, for rising and for falling liquids,
are given. The first is exact enough as the correspondance of
the results obtained by experiments to those obtained by
calculation is satisfactory. For the determination of the
amplitude ("amplituda") of the wave profile the electric
resistance of the liquid film, dependent on its surface
curvature, was used. Figure 3 shows the results of the
measuring of the amplitude dependent on the gas speed in

Card 2/4

20-4-36/52

rising and falling liquid current. In the first case the
amplitude varies from 0,86 to 0,48, in the last case it is
constant and amounts to 0,46. With both directions of the
current it is independent of the current speed. Figure 4A
shows experimental results on the dependence of the
absorption coefficients of CO_2 by water on the wave length
and on the amplitude of the rising and falling current. The
coefficients of the mass exchange are dependent on the
wave length and the amplitude. The data on the mass exchange
can be placed satisfactorily within a curve if it is assumed
that the mass exchange coefficients are proportional
to the square of the amplitudes with any (fixed) value
of the wave length. Finally the possibilities of calculating
the CO_2 absorption coefficient by water, the wave length, and
the thickness of the liquid film, are given.
There are 4 figures, 1 table, and 11 references, 9 of which
are Slavic.

Card 3/4

Mass Exchange in Thin Liquid Films   20-4-36/52

ASSOCIATION: Scientific Institute for Physical-Chemical Research
             imeni L. Ya. Karpov (Nauchno-issledovatol'skiy fiziko-khimicheskiy
             institut im. L. Ya. Karpova).

SUBMITTED: July 3, 1957

AVAILABLE: Library of Congress

Card 4/4

KONCBEYEV, B.I., Cand Chem Sci—(diss) "Hydrodynamics and mass-ex-change in films of a liquid at high velocity of gas." Mos, 1958. 10 pp (Min of Chemical Industry USSR. Order of Labor Red Banner Sci Res Phys-Chem Inst im L.Ya. Karpov), 110 copies   (KL,22-58,102)

- 21 -

KOROBKIN, A.I., kand.khim.nauk; HARTSEV, V.A., kand.khim.nauk;
ZHAVORONKOV, N.M.

Film absorption in a high speed gas flow. Khim. prom. no.7:475-
481 Jl '61.   (MIRA 14:7)

1. Chlen-korrespondent AN SSSR (for Zhavoronkov).
                    (Absorption)

MONGAYT,I.L.; KONOBEYEV,S.I.

Sewage from plants producing synthetic alcohol by pyrolysis. Vod.
i san. tekh. no.3:20-22 Je '55.   (MIRA 8:12)
    (Factory and trade waste) (Wood--Distillation)

Submitted :   No date

KONOBEYEV, Yu.V.

Effect of reabsorption on damping of the phosphorescence of
molecules in a plane-parallel layer. Opt. i spektr. 15
no.3:375-380 S '63.
(MIRA 16:10)

AUTHORS: Agranovich, V.M. and Konobeyev, Yu.V.   SOV/51-6-2-22/39

TITLE: On the Free-Path Length of an Exciton in a Molecular Crystal (O
                dline svobodnogo probega eksitona v molekulyarnom kristalle)

PERIODICAL: Optika i Spektroskopiya, 1959, Vol 6, Nr 2, pp 242-245 (USSR)

ABSTRACT: The authors calculated theoretically the mean free path of a
                "non-localized" (free) exciton interacting with the acoustical branch
                of lattice vibrations.   For the cubic lattice, when the interaction
                with only the nearest neighbours is considered and the effective exciton
                mass approximation is used, the authors obtained a value of 20 Å for
                the mean free path of an exciton in a molecular crystal under the
                conditions of thermal equilibrium at 300°K. The diffusion coefficient
                of excitons was found to be of the order of 1 cm^2/sec. This value is
                one order higher than the values obtained by the direct measurements
                (Refs 1-3). This difference between the observed and calculated

Card 1/2

On the Free-Path Length of an Exciton in a Molecular Crystal   SOV/51-6-2-22/39

diffusion coefficients may be due to either the importance of the "localized" excitons, or due to lattice defects distributed in such a way that the distances between them are less than the calculated value of the exciton mean free path. There are 8 references, 5 of which are Soviet, 1 Czech and 2 English.

SUBMITTED: June 25, 1958

Card 2/2

24(4), 24(6)

SOV/51-6-5-15/34

AUTHORS: Agranovich, V.M. and Konobeyev, Yu.V.

TITLE: The Effect of Re-Absorption on the Yield and Duration of Luminescence
               of Molecular Crystals. I. (Vliyaniye reabsorbtsii na vykhod i
               dlitel'nost' lyuminestsentsii molekulyarnykh kristallov. I)

PERIODICAL: Optika i Spektroskopiya, 1959, Vol 6, Nr 5, pp 648-658 (USSR)

ABSTRACT: In previous work on phenomenological theory of excitons in molecular
               crystals (Refs 1-3) it was implicitly assumed that reflection of
               luminescence light from crystal surfaces can be neglected. Experimental
               evidence (Ref 4) shows that if this reflection is neglected the
               luminescence curves may be affected in some cases. For this reason
               the authors discuss here a kinetic equation which describes the
               distribution of excitons in a molecular crystal and which allows for
               internal reflection of luminescent light from crystal surfaces. For
               the case when the exciton diffusion coefficient is sufficiently small,
               exact formulae are obtained which give the quantum yield and duration
               of luminescence of crystals in the form of plane-parallel plates of any
               thickness. From the formulae which give the quantum yield the lumines-
               cence spectra can be deduced. The paper is entirely theoretical. There are
               2 tables and 8 Soviet references.
Card 1/1

SUBMITTED: May 12, 1958

$O11 / CL_2$

24,7600 (1043, 1155, 1158)

S/181/61/003/001/011/042
B006/B056

AUTHORS: Agranovich, V. M., Konobeyev, Yu. V.

TITLE: Theory of the thermal conductivity of dielectrics below the Debye temperature

PERIODICAL: Fizika tverdogo tela, v. 3, no. 1, 1961, 97-99

TEXT: The theory of the thermal conductivity of dielectrics with $T \ll \theta$ shows unsatisfactory agreement with the experiment. Especially the expression derived by Klemens for the coefficient of thermal conductivity K is not clear in some respects. The present paper deals in detail with studies by Ziman (Ref. 3), and it is shown in what way an expression for χ that shows better agreement with the experiments may be found. Ziman used a variational principle to solve the Boltzmann equation

$$L g(\vec{f}, s) = - \frac{N_0(N_0+1)}{\mathcal{T}} \left[g(\vec{f}, s) + \partial N/\partial t \right] = -v_{fsx} \frac{\hbar \omega}{kT^2} N_0(N_0+1) dT/dx = X \text{ by means}$$

of the function $N(\vec{f}, s) = N_0(\omega) + g(\vec{f}, s) N_0(N_0+1)$. $N_0(\omega) = (\exp \frac{\hbar \omega}{kT} -1)^{-1}$, $v_{fs} = \partial \omega(\vec{f}, s)/\partial \vec{f}$; s characterizes the polarization; f is the quasi-momentum.

Card 1/4

Theory of the thermal...

This Boltzmann equation may be solved by the method of least squares, i.e., by finding the minimum of the functional

$J = \sum_{\vec{r},s} (Lg - X)^2 \equiv \langle Lg - X, Lg - X \rangle$; one obtains, like Ziman, $g = Cf_x$ as a trial function, where C is a constant. The following expression is then obtained for $\varkappa$:

$$\varkappa = \frac{\frac{12.99}{\pi^2} \frac{k^4}{\theta^2} \left(\frac{T}{\theta}\right)^3 \int_0^{\theta} \frac{x^4 e^x dx}{(e^x - 1)^4 l_0 \left(\frac{kT}{\theta} x\right)}}{\int_0^{\theta} \frac{x^4 e^x dx}{(e^x - 1)^4 l_0 \left(\frac{kT}{\theta} x\right)}} \quad (3);$$

the relaxation length, l_0, is defined by $1/l_0 = \sum_\alpha 1/l_\alpha$, where l is the mean free path corresponding to the α-th process. If one confines oneself to four processes which are assumed to play the main part in dielectrics, one obtains

$1/(l_0 kTx/\hbar) = 1/L + A\epsilon (T/\theta)^4 x^4/a + S(T/\theta)^2 \exp(-\theta/2T) - x^2/a + B(T/\theta)^2 x^2/a$,

where $x = \hbar\omega/kT$; L is a length of the order of the specimen dimension; ϵ is the impurity concentration in the crystal; A and B are constants

Card 2/4

89278

Theory of the thermal...

S/181/61/003/001/011/042
B006/B056

which depend on the nature of the impurities and on the grain size; S is a constant related to transfer processes; $\overline{v}$ is the mean velocity of sound; and a is the lattice constant. For that temperature range. in which phonon scattering by impurities is the most probable process, the expression for

K is reduced to: $K = \dfrac{a}{2\tau^2} \dfrac{k^4 \theta^4}{\hbar^3 \overline{v}^2} \dfrac{0.0383}{A\ell} \dfrac{1}{T}$ (5); this is 2.3 times the value

obtained by Ziman. If the impurities are isotopes, then

$A\ell = (6\pi^2)^{1/3} \dfrac{9\tau}{\sqrt{3}} \dfrac{\sum (M_i - \overline{M})^2 c_i}{\overline{M}^2}$, where c_i is the concentration of the various

isotopes. Eq. (5) shows better agreement with the experiment than that by Ziman. For Ge with known isotopic composition, one obtains experimentally at 50°K: $K = 12$ v/cm·deg,

        according to Ziman 3.1 v/cm·deg,
        according to (5)   7.1 v/cm·deg, and
        according to Klemens 166 v/cm·deg.

I. Ya. Pomeranchuk is mentioned. There are 6 references: 1 Soviet-bloc and 5 non-Soviet-bloc.

Card 3/4

89278

20108

S/181/61/003/002/006/050
B102/B204

9.4300 (and 1035, 1043)

AUTHORS: Agranovich, V. M. and Konobeyev, Yu. V.

TITLE: The theory of the edges of the exciton absorption bands

PERIODICAL: Fizika tverdogo tela, v. 3, no. 2, 1961, 360-369

TEXT: If one considers the delayed interaction of electrons with one
another in a crystal field, new elementary excitations occur already in
zero-th approximation besides the excitons and transversal photons, which
may be considered to be a "mixture" of these two states; according to
Hopfield, they are called polaritons. They are excited by light waves
inciding upon the crystal from outside, and the attenuation of light when
passing through the crystal is due to interaction between polaritons and
lattice vibrations. Consideration of the delay may be of importance for
such exciton absorption bands as correspond to greater oscillator forces.
In this case, an additional absorption may occur also with positive
effective exciton masses at frequencies lower than the limit frequency of
the exciton branch; at low temperatures, this additional absorption deter-
mines the shape of the long-wave edge of the exciton absorption bands.

Card 1/9

20108

The theory of the edges of the...

This is here theoretically investigated by the example of a molecular crystal. For reasons of simplicity, only acoustic lattice vibrations are taken into account. First, the suitable formulation of the electron-phonon Hamiltonian in consideration of retardation is discussed. As end form

$$\hat{H} = \hat{H}_0 + \hat{H}_{p\text{-ш.}} + \hat{H}_{m.} \equiv V_0 + \sum_{k,p} \mathcal{E}_p(k)\, \xi_{pk}^{+}\, \xi_{pk} +$$

$$+ \sum_{\substack{m_1 m_2 \\ x_1 x_2}} A^{x_1 x_2}_{m_1 m_2}\, u_{m_1 x_1}\, u_{m_2 x_2} + \frac{1}{2}\sum_{m} \frac{M \dot{u}_m^2}{2} + \sum_{\substack{kp,\, k_1 p_1 \\ mx}} B(kp,\, k_1 p_1;\, mx)\, \xi_{kp}^{+}\, \xi_{k_1 p_1}\, u_{mx}. \quad (9)$$

Здесь

$$B(kp,\, k_1 p_1,\, mx) = \frac{u_k^*(p)\, u_{k_1}(p_1)}{N}\, e^{im(k_1 - k)}\, [\Phi^x(k_1) - \dot{\Phi}^x(k)]. \quad (10)$$

is obtained, where $\xi_{\varrho k}^{+}$ and $\xi_{\varrho k}^{-}$ are the Bose creation and annihilation operators of the polariton $(\varrho \vec{k})$, $\mathcal{E}_{\varrho}(\vec{k})$ is the energy of the polariton

Card 2/9

The theory of the edges of the...

20108
S/181/61/003/002/006/050
B102/B204

branch ϱ with the wave vector $\vec{k}$, $\Phi^x(\vec{k}) = \sum_{\vec{m}_1} \Phi^x_{\vec{m}\vec{m}_1} e^{ik(\vec{m}_1-\vec{m})}$, u_{sx} is the

x-th projection of the displacement vector of the s-th molecule from equilibrium. In the following, the spectrum of the elementary excitations in the concrete case of a crystal with one molecule per elementary cell is investigated. It is assumed that a non-degenerate electron transition in an isolated molecule is allowed in dipole approximation. If here retardation is not taken into account, the lowest elementary excitations are two coinciding branches of transverse photons (polarization $j = 1,2$) and one exciton branch (polarization in the direction of the dipole moment of the transition in the molecule). For the polariton spectrum one obtains

$$\mathcal{E}_{1,2}^2(q) = \frac{E^2(q) + \dfrac{c^2q^2 + \omega_0^2 F \sin^2\varphi}{\varepsilon_0}}{2} \pm$$

$$\pm \frac{1}{2}\sqrt{\left(E^2 + \frac{c^2q^2 + F\omega_0^2 \sin^2\varphi}{\varepsilon_0}\right)^2 - \frac{4c^2q^2E^2(q)}{\varepsilon_0^2}} .$$ (12)

Card 3/9

20108

The theory of the edges of the...

The displacement vector is given by

$$u_k(\rho) = T(k) \sqrt{\frac{kc\,[E(k) + \delta_\rho(k)]^2}{\delta_\rho(k)\,[4kcE(k)\,|T(k)|^2 + (E^2(k) - \delta_\rho^2(k))^2]}}, \qquad (13)$$

$$T(k) = i \sqrt{\frac{2\pi N}{kcV}}\,|P_{0f}|\,\sin\varphi(s)\,E(k). \qquad (14)$$

$E(\vec{q})$ is the exciton energy, F the oscillator force, N/V is the number of elementary cells per unit of volume, $\vec{P}_{of}$ - the dipole moment of the transition into an isolated molecule. In the following, the contour of the absorption bands is calculated, using the Green temperature functions for polaritons and phonons

$$G(\rho k x_0, \rho' k' x_0') = \frac{i}{\langle S \rangle} \langle T\,\{\xi_{\rho k}(x_0)\,\xi_{\rho' k'}^+(x_0')\,S\} \rangle, \qquad (16)$$

$$D_{\alpha\beta}(m x_0; m' x_0') = -\frac{i}{\langle S \rangle} \langle T\,\{u_{m\alpha}(x_0)\,u_{m'\alpha'}(x_0')\,S\} \rangle, \qquad (17)$$

$$S = T e^{i\sum_m \int dr_0\,J_m^\alpha(r_0)\,u_{m\alpha}(r_0)}$$

Card 4/9

The theory of the edges of the...

After a Fourier transformation,

$$G(\rho, \rho', \mathbf{k}; E) = G^{(0)}(\rho, \mathbf{k}, E)\, \delta_{\rho\rho'} - (2\pi)^3 G^{(0)}(\rho, \mathbf{k}, E) \sum_{\rho''} M_{\rho\rho''}(\mathbf{k}, E) \times$$

$$\times G(\rho'', \rho', \mathbf{k}; E), \tag{19}$$

где в первом неисчезающем приближении теории возмущений

$$M_{\rho\rho''}(\mathbf{k}, E) = -\frac{1}{\sqrt{N}} \sum_{\rho_1 \mathbf{k}_1 \beta} \Phi^{\alpha}(\mathbf{k}_1, \mathbf{k})\, \Phi^{\beta}(\mathbf{k}, \mathbf{k}_1)\, |u_{\mathbf{k}_1}(\rho_1)|^2 \times$$

$$\times u_{\lambda}^{*}(\rho)\, u_{\lambda}(\rho'') \int dE'\, G^{(0)}(\mathbf{k}_1, \rho_1; E')\, D^{(0)}_{\beta\alpha}(\mathbf{k} - \mathbf{k}_1, E' - E). \tag{20}$$

Здесь

$$\Phi^{\alpha}(\mathbf{k}, \mathbf{k}_1) = \Phi^{\alpha}(\mathbf{k}) - \Phi^{\alpha}(\mathbf{k}_1).$$

is obtained for the Dyson equation, where (20) holds in first perturbation-theoretical approximation. Thus, finally

$$M_{\rho\rho''}(\mathbf{k}, E) = -\frac{1}{4\pi MN} \sum_{\rho, \mathbf{k}_1, j} \frac{(\Phi(\mathbf{k}_1, \mathbf{k})\, e_j)\,(\Phi(\mathbf{k}_1, \mathbf{k})\, e_j)}{\omega_j(\mathbf{k} - \mathbf{k}_1)} \times$$

$$\times \left[\frac{n(\omega_j(\mathbf{k} - \mathbf{k}_1))}{E - \delta_{\rho_1}(\mathbf{k}_1) + \omega_j(\mathbf{k}_1 - \mathbf{k})} + \frac{1 + n(\omega_j(\mathbf{k} - \mathbf{k}_1))}{E - \delta_{\rho_1}(\mathbf{k}_1) - \omega_j(\mathbf{k} - \mathbf{k}_1)} \right] \times$$

Card 5/9

$$\times |u_{\mathbf{k}_1}(\rho_1)|^2\, u_{\mathbf{k}}^{*}(\rho)\, u_{\mathbf{k}}(\rho''). \tag{24}$$

The theory of the edges of the...

is obtained for $M_{ss''}(\vec{k},E)$. The fact that the matrix M has off-diagonal elements, leads to a certain deformation of the polariton spectrum; in the approximation studied here, this deformation is due to virtual phonon exchange of polaritons belonging to different branches. These processes may be, above all, of essential importance if $\vec{k}$ has nearly the same direction as the polarization of the transition in the molecule ($\varphi(\vec{s})$ being small with respect to the energy gap). Further, only the case of large $\varphi(\vec{s})$ is investigated, where the off-diagonal terms remain insignificant. For the purpose of determining the imaginary part of polaron energy with phonons, which is due to interaction, the imaginary part of the mass operator is first determined. By approximation, the following is obtained:

$$\operatorname{Im} M_{pp}(\mathbf{k},\,E) = -\frac{id^3}{4\,(2\pi)^3 M} \sum_{p_1,\,j} \int d\mathbf{k}_1 \,\frac{|\, \mathbf{e}_j \Phi\,(\mathbf{k},\,\mathbf{k}_1)|^2}{\omega_j\,(\mathbf{k}-\mathbf{k}_1)} \times$$

$$\times\,(n\,(\omega_j(\mathbf{k}_1-\mathbf{k}))\,\delta\,(E_p\,(\mathbf{k}) - \mathcal{E}_{p_1}(\mathbf{k}_1) + \omega_j\,(\mathbf{k}_1-\mathbf{k})) +$$

$$+\,[1 + n\,(\omega_j\,(\mathbf{k}-\mathbf{k}_1))]\,\delta\,(E_p\,(\mathbf{k}) - \mathcal{E}_{p_1}(\mathbf{k}_1) - \omega_j\,(\mathbf{k}-\mathbf{k}_1)))\times$$

$$\times\,|\,u_p\,(\mathbf{k})\,|^2\,|\,u_{p_1}\,(\mathbf{k})\,|^2. \qquad (25),$$

Card 6/9

20108

The theory of the edges of the...

$$\left.\begin{aligned} \text{Re}\, E_p(k) &= \mathscr{E}_p(k) - 2\pi\, \text{Re}\, M_p(k,\ E_p(k)), \\ |\,\text{Im}\, E_p(k)\,| &= |\,2\pi\, \text{Im}\, M_p(k,\ E_p(k))\,|. \end{aligned}\right\} \qquad (26)$$

and, in Debye approximation,

$$\text{Im}\, E_1(k) = \frac{d^3}{16\pi^2 M}\int df\, \frac{|\Phi(k,\ k-f)|^2}{\omega(f)}\, \{\, n(\omega(f))\,\delta(\mathscr{E}_1(k) - \mathscr{E}_1(k-f) + \omega(f)) +$$

$$+ [1 + n(\omega(f))]\,\delta(\mathscr{E}_1(k) - \mathscr{E}_1(k-f) - \omega(f)). \qquad (27)$$

Herefrom it follows that also at very low temperatures, if $n(\omega)\simeq 0$ in the energy range of $\mathscr{E}_1(\vec{k}) < E_{exc}(0)$, $\text{Im}\, E_1(\vec{k})$ is non-vanishing, and therefore polariton attenuation occurs. At T = 0

$$\text{Im}\, E_1(k)|_{T=0} = \frac{9c^4 F^2}{16\pi^2 Md^3\mu^2\omega_{0f}^2}\int \frac{df}{\omega(f)}(f^2 + 3f_z^2)\times$$

$$\times\,\delta(\mathscr{E}_1(k) - \mathscr{E}_1(k-f) - \omega(f)). \qquad (30)$$

holds, which may be represented approximately by

$$\text{Im}\, E_1(k)|_{T=0} \simeq \frac{9\gamma_1 F^2 c^4}{32\pi Md^3\omega_{0f}^2 s^4 k^3\mu^2}\left(\frac{\omega_0^2 FE_{exc.}(0)}{2c^2}\right)^2 \times$$

Card 7/9

$$\times\left[\frac{A^2 + 2}{1 + A} - 2\ln(1 + A)\right], \qquad (33)$$

20108

The theory of the edges of the...

S/181/61/003/002/006/050
B102/B204

$$A = \gamma_2 \frac{2 s k^3 c^2}{\omega_0^2 F E_{\text{exc.}}(0)} \cdot \qquad (34)$$

For the absorption coefficient,

$$x \equiv \frac{\operatorname{Im} E_1(k)|_{T=0}}{v_{\text{rp.}}(k)} = \frac{9\gamma_1 F^3 \omega_0^2 E_{\text{exc.}}(0) e^4}{128\pi M \mu^2 d^3 s^4 c^2 \omega_{0J}^2} \left(1 + \frac{k^4 c^2}{M_{\text{exc.}}(s)\,\omega_0^2 F E_{\text{exc.}}}\right) \times$$

$$\times \left[\frac{A^2 + 2A}{1 + A} - 2\ln(1 + A)\right] . \quad (36)$$

$k,\ \frac{1}{\text{cm}}$	A	$\Delta,\ \text{mm}$	$s,\ \frac{1}{\text{cm}}$
$5 \cdot 10^5$	10^{-3}	0.4	$5 \cdot 10^{-3}$
10^9	$8 \cdot 10^{-3}$	0.1	2.5
$2 \cdot 10^6$	$64 \cdot 10^{-3}$	0.025	$1.2 \cdot 10^3$
$4 \cdot 10^6$	$0 \cdot 51$	0.006	$6 \cdot 10^5$
$5 \cdot 10^6$	1	0.004	$\simeq 2 \cdot 10^6$
$k = k_0 \simeq 10^7$	8	0	$\simeq 10^7$

is obtained. Calculated for benzene crystals, the values given in the table result. The results obtained show that here the long-wave absorption edge due to retardation of the range 100 - 200 cm^{-1} is extended below the exciton energy limit $E_{\text{exc}}(0)$. At sufficiently low temperature, this effect remains essential and may in favorable cases produce an effect upon the exciton absorption line widths at low temperatures. A.S.Davydov, S. I. Pekar, and S. V. Tyablikov are mentioned. There are 1 figure;,

Card 8/9

AGRANOVICH, V.M.; KONOBEYEV, Yu.V.

Reabsorption in crystals of finite thickness. Part 2.
Opt. i spektr. 11 no.3:369-384 S '61.   (MIRA 14:9)
            (Crystals—Optical properties)

AGRANOVICH, V.M.; KONOBEYEV, Yu.V.

    Effect of the self-absorption of light on the spectral dependence
of the photoconductivity of molecular crystals. Opt.i spektr.
11 no.4:498-503 O '61.   (MIRA 14:10)
      (Crystals--Spectra)   (Photoconductivity)

KONOBEYEV, Yu.V.

Self-absorption in crystals of finite thickness. Part 3. Opt.i
spektr. 11   no.4:504-512 O '61.   (MIRA 14:10)
            (Crystals—Optical properties)

KONOBEYEV, YU. V.

Dissertation defended for the degree of Candidate of Physicomathematical Sciences at the Physics Institute imeni P. N. Lebedev in 1962:

"Theory of the Migration of Electronic Excitation in Molecular Crystals."

Vest. Akad. Nauk SSSR.   No. 4, Moscow, 1963, pages 119-145

S/181/62/004/012/039/052
B125/B102

AUTHOR: Konobeyev, Yu. V.

TITLE: The effect of defects on the exciton luminescence of molecular
             crystals

PERIODICAL: Fizika tverdogo tela, v. 4, no. 12, 1962, 3634-3639

TEXT: The probability for an exciton to be converted into light (or the
scattering of a polariton from the lattice defect) is calculated by the
more precise and more conclusive microscopic theory developed by V. M.
Arganovich (Zh....., 37, 430, 1959) for molecular crystals of arbitrary
symmetry. The macroscopic defects involved in earlier calculations of this
probability based on the phenomenological theory may be absent in
sufficiently perfect crystals. A molecule contained in an arbitrary site
characterized by the lattice vector is assumed to be replaced by an
impurity molecule, including also the case in which the molecule is absent.
The Hamiltonian $\hat{H} = \hat{H}_0 + \hat{H}_1$ of such a molecular crystal consists of the
Hamiltonian $\hat{H}_0 = \sum_{\vec{k},Q} E_Q(\vec{k}) \int_{Q\vec{k}}^{+} \int_{Q\vec{k}}$ of the ideal molecular crystal and

Card 1/4

The effect of defects on the ...

of the addition $\hat{H}_1$ for the distortion. $\hat{H}_1$ can easily be derived from the results obtained by V. M. Arganovich and be reduced to the form

$$\hat{H}_1 = \frac{1}{N} \sum_{k',k''} \sum_{p',p''} g_m(k''_1, k'_2)[u^*_{k'}(p') u_{k''}(p'') \xi^+_{p'k'} \xi_{p''k''} +$$

$$+ u^*_{k'}(p') v^*_{k''}(p'') \xi^+_{p'k'} \xi_{p''k''} + v_{k'}(p) u_{k''}(p'') \xi_{p'k'} \xi_{p''k''} +$$

$$+ v_{k'}(p') v^*_{k''}(p'') \xi_{p'k'} \xi^+_{p''k''}], \qquad (7),$$

$$g_m(k'', k') = e^{i(k''-k')m}[\Delta_m + V(0f, f0; -k'') -$$

$$- V(0f, f0; -k''') + \tilde{V}(0f, f0; k') - V(0f, f0; k') + \tilde{V}(f0, f0; k'' - k') - \qquad (8)$$

$$- \tilde{V}(00, 00; k'' - k') - V(0f, 0f; k'' - k') + V(00, 00; k'' - k')].$$

by a linear transformation. $B^+_{\vec{s}f}$ and $B_{\vec{s}f}$ are the Bose production and annihilation operators of the f-th electron excitation of the molecule at the site s. Products of the type $B_{\vec{s}f}B_{\vec{s}_1 f}$ and $B^+_{\vec{s}f}B^+_{\vec{s}_1 f}$ are neglected

Card 2/4

The effect of defects on the ...   S/181/62/004/012/039/052
                                                    B125/B102

in the exciton part of the total Hamiltonian. N is the total number of
elementary cells within the crystal. The functions $u_{\vec{k}}(s)$ and $v_{\vec{k}}(\varrho)$
follow from a system of equations adopted from the afore-mentioned previous
work. Further, the equation

$$V(ff', f'f''; k) = \sum_s e^{ik(s-s)} V_{ss}(ff', f'f'').$$ (9)

holds. By integrating with the wave vector $\vec{k}$ of the branch ϱ_1 over the
probability $W_{\vec{k}_1 \to \vec{k}_2}$ for the scattering of a polariton from an impurity
with transition to the state $\vec{k}_2$,

$$W = |V(k_1, k_2)|^2 \frac{k_1^2 V}{\pi \left|\frac{\partial E(k)}{\partial k}\right|_{k=k_2}}.$$ (12)

follows for the total transition probability of a polariton from the state

Card 3/4

The effect of defects on the ...

A to the state B. This formula leads to

$$W = \frac{|\sigma_m(k_1, k_2)|^2}{\pi N} \frac{M_{exc.} d^3 k_0^6}{k_1(k_1^4 - k_0^4)} \frac{1}{1 + \frac{E(0)}{M_{exc.} c^2} \frac{k_1^4}{k_0^4}} \cdot \qquad (21)$$

which applies, however, only to cubic crystals and to the largest terms. $M_{\ni KC} = M_{exc} - |m_{exc}|$ is the effective exciton mass and d is the lattice constant. W is that portion of the imaginary section of the complex polariton energy which describes the damping of a polariton wave ($W \to \infty$ if $k_1 \to k_0$). With $d = 5$ Å, $M_{exc} = 10 \mu$ (μ is the electron mass) $k_0 = 10^6$ cm^{-1}, $E(0) = 2.5$ ev, $\varepsilon_m^{\to} = 0.1$ ev and $k_1 = 1.5 k_0$; $k_1 = 3 k_0$ and $k_1 = 10 k_0$, the resulting for the probabilities are $W = 1.5 \cdot 10^{13}/N$; $W = 3.5 \cdot 10^{11}/N$ and $W = 9 \cdot 10^8/N$. The numerical value of the total probability for the scattering of a polariton from a defect depends very strongly on the shape of the exciton band. The present considerations apply if the bottom of the exciton band under investigation is not too far away from the maximum of the polariton band. There is 1 figure.
SUBMITTED: July 16, 1962
Card 4/4

GALANIN, M.D.; KONOBEYEV, Yu.V.; CHIZHIKOVA, Z.A.

Effect of reabsorption on the law of damping of the
luminescence of anthracene crystals. Opt. i spektr.
13 no.3:386-389 S '62.   (MIRA 15:9)
          (Anthracene crystals) (Luminescence)

L 18744-63   EWT(1)/BDS   AFFTC/ASD/IJP(C)/SSD
ACCESSION NR: AT3002208   S/2941/63/001/000/0135/0147

AUTHOR: Konobeyev, Yu. V.

TITLE: Effect of exciton diffusion on kinetics of luminescence

SOURCE: Optika i spektroskopiya; sbornik statey. v. 1: Lyuminestsentsiya.
Moscow, Izd-vo AN SSSR, 1963, 135-147

TOPIC TAGS: migration, exciton, diffusion length, reabsorption

ABSTRACT: In crystal molecules the migration of the excitation energy of electrons
can occur by either the mechanism of exciton diffusion (radiationless process) or
the mechanism of reabsorption. Starting from integrodifferential kinetic equations
describing exciton concentration distributions, the author develops expressions
to describe exciton migrations in semiconducting crystals. The analysis is di-
vided into stationary and nonstationary (exponentially time-dependent luminescence)
cases, and in each case the complex integrodifferential equations are simplified
and integrated in closed form for the limiting cases of weak and strong re-
absorption. As an example a detailed calculation is given for the anthracene

Card   1/2

L 18744-63
ACCESSION NR:. AT3002208

molecule. "The author expresses his gratitude to V. M. Agranovich for his
evaluation of this work." Orig. art. has: 48 equations.

ASSOCIATION: none

SUBMITTED: 05Apr62   DATE ACQ: 19May63   ENCL: 00

SUB CODE: PH   NO REF SOV: 007   OTHER: 001

Card 2/2

AUTHOR: Agranovich, V. M.; Konobeyev, Yu. V.

TITLE: Diffusion of excitons in molecular crystals

SOURCE: Fizika tverdogo tela, v. 5, no. 5, 1963, 1373-1376

TOPIC TAGS: exciton, scattering, diffusion, naphthalene, anthracene, electron, electron excitation, lattice defect, thermal defect, exciton scattering, exciton diffusion, energy transfer, molecular crystal

ABSTRACT: The authors take the experimental data of A. A. Kazzaz and A. B. Zahlen (Phys. Rev., 124, 90, 1961) and analyze them to study the energy transfer of electron excitation from its base substance to an impurity in crystals of naphthalene containing low concentrations of anthracene admixtures. They show that the experimental data obtained by Kazzaz and Zahlan confirm the view that this transfer of energy is effected by "free" excitons, the mean free path of which is determined by the temperature and by scattering through collision either with phonons or with thermal defects in the crystal lattice. Orig. art. has: 4 formulas.

ASSOCIATION: none

Card 1/2

AGRANOVICH, V.M.; KONOHEYEV, Yu.V.

Theory of dielectric permeability of crystals. Fiz. tver tela 5
no.9:2544-2555 S '63.   (MIRA 16:10)

ACCESSION NR: AP4019846

AUTHORS: Agranovich, V. M.; Konobeyev, Yu. V.

TITLE: The theory of exciton phonon interaction in molecular crystals

SOURCE: Fizika tverdogo tela, v. 6, no. 3, 1964, 831-841

TOPIC TAGS: exciton, exciton phonon interaction, molecular crystal, Green function, electron phonon interaction, dipole dipole interaction, crystal lattice

ABSTRACT: The authors have used Green's function to investigate the effect of electron-phonon interaction on the spectra of excitons and phonons in molecular, crystals. They have assumed that the energy of a crystal is manifested chiefly in dipole-dipole interaction between molecules and that the interaction of excitons with intramolecular vibrations of the nuclei may be neglected. In employing this model of a molecular crystal, they have shown that exciton-phonon interaction may be considered a weak perturbation, not leading to any local deformation of the lattice and, consequently, not leading to the formation of localized excitons. It is concluded, within the framework of the model they have employed for molecular

Card 1/2

DUBOVSKIY, O.A.; KONOBEYEV, Yu.V.

    Capture of free excitons by shallow traps in molecular crystals.
    Fiz. tver. tela 6 no.9:2599-2609 S '64.

                                      (MIRA 17:11)

L 12643-65   EWT(1)/T/EEC(b)-2   IJP(c)

ACCESSION NR: AP4044927   S/0181/64/006/009/2599/2609

AUTHORS: Dubovskiy, O. A.; Konobeyev, Yu. V.

TITLE: Capture of free excitons by shallow traps in molecular crystals

SOURCE: Fizika tverdogo tela, v. 6, no. 9, 1964, 2599-2609

TOPIC TAGS: exciton phonon interaction, molecular crystal, electron capture, exciton capture, exciton band, spectrum shift, impurity

ABSTRACT: The investigation was stimulated to a considerable degree by the results of Propstl and Wolf (Zeits. fur Naturfors. v. 18a, 822) for which no satisfactory theoretical explanation is given using the weak exciton-phonon coupling approximation, the calculate the probability for the capture of a free electron molecular crystal by a shallow local energy level lying below the exciton band at a distance smaller than the energy

Card   1/3

L 12643-65
ACCESSION NR: AP4044927

of the Debye phonon. The purpose of this calculation is to show
that the probabilities obtained by Propstl and Wolf for the capture
of an excitation by an impurity which forms a shallow local level
of this type can be satisfactorily explained by assuming that the
energy is transferred by free excitons (coherent excitons). The
situation considered in greatest detail is the one in which the re-
placement of the molecule of the host substance by the impurity
molecule leads only to a shift in the spectral terms. It is shown
that at sufficiently low temperatures the magnitude and temperature
dependence of the capture probability of the free exciton by a
site, followed by emission of a single acoustic phonon,
with the known experimental data. For the case of the naph-
thalene, the theoretical estimate for the quantities charac-
terizing the probability is 1.2×10^{11} sec^{-1}, whereas the experi-
mental is 5×10^{11}. "The authors thank V. M. Agranovich for
discussions and valuable advice." Orig. art. has: 42 formu-

L 12643-65
ACCESSION NR: AP4044927

ASSOCIATION: None

SUBMITTED: 24Feb64   ENCL: 00

                        NR REF SOV: OTHER: 003

L 25087-65   EWT(1)/EPA(s)-2/EEC(t)   Pt-10/Pl-4   IJP(c)   GG

ACCESSION NR: AP5003421   S/0181/65/007/001/0111/0117

AUTHORS: Agranovich, V. M.; Konobeyev, Yu. V.

TITLE: Theory of long-wave surface excitons in dielectrics

SOURCE: Fizika tverdogo tela, v. 7, no. 1, 1965, 111-117

TOPIC TAGS: exciton, dielectric, polarization, surface state, crystal boundary, crystal conductivity

ABSTRACT: In view of recent experiments performed on absorption lines connected with the excitation of surface excitons, the authors developed, within the framework of the macroscopic approach, a ... d which makes it possible to determine the polarization and the ... es of long-wave exciton surface states. It is shown that ... characteristics are determined completely by the analytic continuation of the dielectric tensor of the crystal into the region of complex wave vectors, and also in some cases by additional boundary

Card   1/3

L 25087-65

ACCESSION NR: AP5003421

conditions, which must be used to take account of spatial dispersion.
The case of surface excitons is considered in some detail for an
isotropic medium that borders on vacuum. Two types of surface ex-
citons are found in this case, one with nonzero electric vector, for
which there is no need to take account of the spatial dispersion,
and one type with zero electric vector and nonzero induction vector,
which calls for the use of additional boundary conditions. The
approach used is a natural development of the method described by
one of the authors previously (Agranovich, with V. L. Ginzburg, UFN,
v. 77, 663, 1962), for the investigation of volume excitons with ac-
count of spatial dispersion. The limitations of the microscopic ap-
proach to the problem are pointed out in the conclusion. "The
authors thank V. L. Ginzburg for valuable advice." Orig. art. has:
12 formulas.

ASSOCIATION: None

Card   2/3

EWT(1)/T/EEC(b)-2   P1-4   IJP(c)   s/0181/65/007/003/0946/0947

ACC NR: AP5006923

Dubovskiy, O. A. ; Konobeyev, Yu. V.

Cross section for the scattering of a free exciton by an impurity in a molecular crystal.

Fizika tverdogo tela, v. 7, no. 3, 1965, 946-947

TOPIC TAGS: exciton, molecular crystal, scattering cross section, impurity level

Earlier calculations of the scattering cross section were based on too rough assumptions or limited to a linear model. In the present article the cross section is determined for the three-dimensional case, using a general expression obtained earlier (FTT, 1964) for the normalized amplitudes of the exciton in the lowest band in the presence of a lattice imperfection. Use is also made of a procedure developed by A. M. Afanas'ev (ZhETP v. 19, 293, 48) to obtain asymptotic expressions for the normalized amplitude. The calculations show that the mean free path of the exciton is quite small either when the impurity concentrations are

Card 1/2

ACC NR. AM5022447   Monograph   UR/

Konobeyev, Yu. V.

Theory of electron-excitation energy migration in molecular crystals
   (K teorii migratsii energii elektronnogo vozbuzhdeniya v molekul-
   yarnykh kristallakh) Moscow, 1965. 114 p. illus., biblio.. (At
   head of title: Gosudarstvennyy komitet po ispol'zovaniyu atomnoy
   energii SSSR) Dissertation submitted for the degree of candidate of
   physical and mathematical sciences.

Series note: Obninsk. Fiziko-energeticheskiy institut [Dissertatsii]

TOPIC TAGS: crystal, molecular crystal, exciton, photoconductivity,
polaron, luminescence, radiative transfer, crystal defect, reabsorption

PURPOSE AND COVERAGE: The book is intended for physicists, astro-
physicists, and scientists working in the field of solid-state physics,
atomic and nuclear physics, and physical chemistry. Theoretical inves-
tigations of problems associated with the migration of energy of elec-
tron excitation in molecular crystals are made. The book consists of
two chapters. Chapter I deals with the development of the phenomeno-
logical theory of migration of the energy of electron excitation in
molecular crystals. Integral-differential equations are solved for
the density of excitons in the case of an arbitrary diffusion coeffi-

Card 1/4

cient of excitons and an arbitrary superposition of the emission and
absorption spectra in molecular crystals. Chapter II is devoted to
the theory of parameters characterizing the exciton mechanism of
migration of electron excitation energy in molecular crystals. The
length of diffusion displacement of free excitons in molecular crystals
is calculated and its temperature dependence is found. The author
thanks V. M. Agranovich, M. D. Galanin, V. L. Levshin, and Z. A.
Chizhikova. There are 59 references, primarily Soviet.

TABLE OF CONTENTS:

Introduction -- 3

Card 2/4

KONOEEYEVA, G.M.

Some microbiological material on the evolution of soils in the
Kunyadar'inskaya Plain. Izv.AN Uz.SSR no.7:25-33 '56.

(MIRA 14:5)

(Tashauz Province--Soils)

KONOBEYEVA, G. M., Cand Biol Sci (diss) -- "The soils of ancient oases of the

Kunya Dar'ya plain, and their evolution". Tashkent, 1959. 20 pp (Acad Sci

Uzbek SSR, Inst of Soil Science), 175 copies (KL, No 9, 1960, 123)

KONOBEYEVA, G.M.

Changes in the chemical properties of takyr soils on ancient oases
of the Kunya-Darya Plain following discontinuation of irrigation.
Uzb.biol.zhur. no.5:62-69 '59.   (MIRA 13:4)

1. Institut pochvovedeniya AN UzSSR.
              (DAHYALYK VALLEY--SOIL CHEMISTRY)

KONOBEYEVA, G.M.

Resistance of some types of soil microorganism to the action of
anabasine. Mikrobiologiia 29 no.2:234-237 Mr-Ap '60. (MIRA 14:7)

1. Institut pochvovedeniya AN UzSSR, Tashkent.
            (SOILS--MICRO-ORGANISMS)   (ANABASINE)

1. KONOBEYEVA, N. I., BRAGIN, S. M.

2. USSR (600)

4. Cement Kilns

7. Speeding up clinker burning Tsement 18/no. 1, 1952
   Inzh. Khilkovskiy Tsementnyy Zavod

9. Monthly List of Russian Accessions, Library of Congress, June 1952.
   UNCLASSIFIED

L 63022-65   EWT(m)/EPF(c)/EWP(j)/T   Pc-4/Pr-4   JAJ/RM

N NR: AP5014854   4001/0585/0588

Semetkin, N. S. (Corresponding member

Ye. Ca.; Konoboyevskiy, S.

AN SSSR, Doklady, v. 162, no. 3, 1965,

polymer, polycondensation,   polymer
UR 60 x ray apparatus, UR 10 spectrophotometer

The investigation is a continuation

polymer

CH=CR

A hard polymer was obtained by polymerization in the presence of
potassium at -100C (C). The molecular structure of T and C were

(Institute for Petrochemical Synthesis,
SUBMITTED: 01Oct64   ENCL: 00   SUB CODE: OC, GC

007   OTHER: 003

L 22535-66   EWT(m)/EPF(n)-2/EWP(j)/T/EWA(h)/EWA(l)   IJP(c)   GG/RM
ACC NR: AP6010121   (A)   SOURCE CODE: UR/0190/66/008/003/0553/0556

AUTHOR: Konobeyevskiy, K. S.; Gusel'nikov, L. Ye.; Nametkin, N. S.; Polak, L. S.; Chernysheva, T. I,

ORG: Institute of Petrochemical Synthesis, AN SSSR (Institut neftekhimicheskogo sinteza AN SSSR)

TITLE: Investigation of radiation polymerization of polyfunctional vinyl-siloxanes

SOURCE: Vysokomolekulyarnyye soyedineniya, v. 8, no. 3, 1966, 553-556

TOPIC TAGS: radiation polymerization, vinyl siloxane, siloxane, monomer, polymer, styrene, graft copolymer, vinyl plastic

ABSTRACT: The paper deals with radiolysis, polymerization, and the effect of Gamma rays on monomeric polyfunctional vinyl siloxanes. The existence of stabilized free radicals confirms its microgel nature. The possibility of preparing graft copolymers is demonstrated by initiating styrene polymerization with microgel of 1, 3, 5-trivinyl-1, 3, 5-pentamethyltrisiloxane. Orig. art. has: 3 figures and 1 table. [Based on authors' abstract.]   [NT]

SUB CODE: 07/ SUBM DATE: 24Apr65/ ORIG REF: 002/ OTH REF: 006/

Card 1/1   BLG   UDC: 66.095.26+678.745

KONOBEYEVSKIY, S.T.

"Slip in Crystals in Rolling," Zeitschrift fur Physik, 1927, Vol 43, pp 741-749.

"By a study of Roentgen Pictures of Rolled Al Plate, it is established That Depending
on the Degree of Working Two Textures Can Result. The First is Formed on Account
of the Slip in the Crystals Along the Rhombic Dodecahedron Surface, the Second
Along the Cubiv Surface. The Slip must Run Along the Plane (110) to the 211 Axis"
Zeitschrift Fur Physik, 1927, Vol 43, pp 741-749, Slip in Crystals in Rolling.

KONOBEYEVSKIY, S.T.

   "The Solid Solution of Iron-Graphite," Zeitschrift fur Kristallograpie, Kristallphysik, Kristallchemic, 1929, Vol 72, pp 381-397.

"Diffraction Patterns From Some Natural Graphites were duplicated in Samples of Graphite Heated with Fe. Solid soln. of the Fe in the graphite occurs, with the probable formation of Fe_2C. The Presence of 'Superstructure lines' in the Pattern Indicates a Regular Distribution of the Fe Atoms." Zeitschrift fur Kristallographie, Kristallgeometrie, Kristallphysik, Kristallchemie, 1929, Vol 72, pp 381-397. The Solid Solution of Iron-Graphite.

PROCESSES AND PROPERTIES INDEX

X-Ray Analysis in Metallurgical Laboratories. S. T. Konobejevsky (*Zavod. Lab.* (*Works' Lab.*), 1933, **2**, (3), 3–10).—[In Russian.] A discussion.—N. B. V

ASM-SLA   METALLURGICAL LITERATURE CLASSIFICATION

Ca

Zhm-Fiz.

9

The broadening of the Debye-Scherrer lines on the roentgenograms of metals after cold working and annealing. S. Konobejewski and I. Selezkij. *Physik. Z. Sowjetunion* 9, 69-81(1936).—This phenomenon was studied with Cu, Fe, Al, Zn, Mg and the Al-Zn-Mg alloy "Electron AZM." For Mg, the width of the line is an exponential function of the annealing time for temps. below recrystn. For "Electron," a triplet instead of the K_α doublet is found for high-order lines; this is explained by diffusion of the Al and Zn atoms in the deformed solid-soln. lattice. It is theoretically shown that, in certain temp. intervals, elastic strains can be relieved through a redistribution of the atoms of the components of the solid soln.

Victor Hicks

A S B - S L A   METALLURGICAL LITERATURE CLASSIFICATION

*Transformation of the α-Phase of Copper-Tin Alloys after Deformation.
S. Konobeyevskii and V. Tarasova (*Physikal. Z. Sowjetunion*, 1933, 4, 571–575; *C. Abs.*, 1934, 28, 1254).—[In German.] The work of Westgren and Phragmen on the determination of the phase boundary between the α and the α + δ phases of the copper-tin system is criticized because W. and P. disregarded the effects of deformation in the X-ray samples. The work is repeated; proper annealing preceded by deformation indicates a decreased solubility of α in δ as the temperature is decreased. It is thought that deformation aids heat in reaching equilibrium by redistributing the components in a metastable state, thus increasing the diffusion potential.—S. G.

PROCESSES AND PROPERTIES INDEX

Precision Methods for X-Ray Examination of Metals. S. T. Konobievskii (Zavodskaya Lab., 1933, (6), 23-28; C. Abs., 1934, 28, 7194).—[In Russian.] A general discussion of the apparatus and a few examples of the application of the method.—S. G.

A.S.M.-S.L.A.   METALLURGICAL LITERATURE CLASSIFICATION

M

2

*On the Stability Limits of the α-Phase in Copper-Tin Alloys. S. T. Konobeevskiy and V. P. Tarasova (Zhurnal eksperimentalnoy i teoreticheskoy Fiziki (J. Expr. and Theoret. Physics), 1934, 4, 272-291).—[In Russian.] Annealing of copper-tin alloys at 300° C. results in the decomposition of the α-solid solution with separation of a new phase and change in concentration from 8·5 to 4 atomic-% tin. The solubility of tin in the α solid solution at 650°, 500°, and 480° C. is 8·6, at 410° C. 8·0, at 385° C. 7·2, at 343° C. 6·5, at 325° C. 6·1, and at 300° C. 4·1 atomic-% tin. From the point of view of the mechanism of the diffusion process the presence of heterogeneous stresses in the deformed crystals must give rise in a certain temperature range to definite concentration currents and therefore to the separation of nuclei of the excess solute. The shape of the solubility curve obtained is explained by assuming that the solid solution of tin in copper in the equilibrium state must obey the general thermo-

dynamic expression for solutions: $ln'. S = \frac{Q}{RT} + C$ and that the boundary

curve corresponds with the equilibrium of the δ (γ) phase with the α-solid solution of a definite degree of supersaturation determined by the size of the separated δ (γ) particles. On the basis of three hypotheses the size and number of the crystals formed during decomposition have been determined in relation to the annealing temperature and degree of supersaturation. Theoretical calculations have also been made of the rate of dissolution of the δ (γ) phase in relation to the annealing temperature and compared with the experimental figures.—N. A.

ASM-SLA   METALLURGICAL LITERATURE CLASSIFICATION

PROCESSES AND PROPERTIES

The stability limit of the α-phase in tin-copper solutions. B. Konobeevskii and V. Tarasova, *Physik. Z. Sowjetunion* 5, 848-70(1934); cf. C. A. 28, 1254¹.— The sol. of Sn in Cu is detd. for powd. solid solns. Heating the Cu-Sn solid solns. results in decompn. of the α-solid soln., the appearance of a new phase (probably δ) and a change of concn. (from 8.5 to 4.0 atoms % Sn at 300°). The soly. curve of the δ-phase in the solid soln. is detd. as a function of the temp. to which the pulverized solid is heated. The rate of appearance of the δ-phase and the rate of its soln. are measured. The form of the soly. curve is explained on the basis of a theory of supersatn. The effect of residual strains on the stability of the supersatd. soln. is discussed.   R. O. Wile

A.S.M. S.L.A.   METALLURGICAL LITERATURE CLASSIFICATION

KONOBEYEVSKIY, S.T.

"The Theory of Supercooled Soldid Solutions," Zeitschrift fur Physikalische Chemie, 1934, Vol a171, pp 25-35.

"The Conditions Governing the Stability of Solid Solns. as well as Several Questions Concerning the Sepn. Process (the Preparatory Phase in the Sepn. Process and Oriented Sepn.) are Discussed on the Basis of the Theory of Supercooling." Zeitschrift fur Physikalische Chemie, 1934, Vol A171, pp 25-35. The Thoery of Supercooled Solid Solutions.

PROCESSES AND PROPERTIES INDEX

*Decomposition of Solid Solutions of Copper in Aluminium as the Result of Plastic Deformation and Subsequent Annealing. M. I. Zacharova and S. T. Konobrevsky. (Zhurnal Tchnicheskoy Fiziki (J. Tech. Physics), 1935, 5, (7), 1134–1144).—[In Russian.] The decomposition of supersaturated solid solutions of copper in aluminium has been investigated on lines similar to those employed in the case of the silicon solution (cf. Met. Abs., this vol., p. 570).
—N. A.

A S B . S L A   METALLURGICAL LITERATURE CLASSIFICATION

1ST AND 2ND ORDERS

PROCESSES AND PROPERTIES INDEX

3RD AND 4TH ORDERS

Konobejewski, S., G. Kurdjumov, und W. Tarassow. *Die Röntgenographie in ihre Anwendung zur Materialprüfung.* Pp. xv + 568. 1936. Moscow and Leningrad. Onti. (Rbl. 12.)

ASM-SLA   METALLURGICAL LITERATURE CLASSIFICATION

CA

Theoretical construction of the diagram of state of alloys of some metals. S. T. Konobeevskii. Bull. acad. sci. U. R. S. S., Classe sci. math. nat., Sér. chim. No. 2, 255-67 (in French 267-70) (1936).--Four types of soly. limits of solid soln., were studied: (1) This type is represented by a curve convex upward, and at low temp. approaching asymptotically the y-axis. The equation of this curve is ln A = (B/T) + B, in which S is soly., T abs. temp., and A and B are consts. Examples of this type are the systems Al-Zn and Al-Mg. (2) This type is described by a vertical curve, examples of which are brass and Al bronzes. (3) Cu-Sn and Ni-Sn are of a 3rd type and are represented by soly. curves possessing inflections. (4) This type is illustrated by Cd-Sn, which alloy within certain temp. limits shows a stratification characteristic of a solid soln. The fundamental thermodynamic function detg. the state of a system in the equil. condition is the thermodynamic potential, which for condensed systems can be replaced by the free energy, as T = U₀ - TS₀; the entropy S at 0°K. is S₀ = R[c ln c + (1-c) ln (1-c)] in which c is the concn. H. K. Mesermore

12. Ak-Nauk SSSR, Sev. Khim·

A S B - S L A METALLURGICAL LITERATURE CLASSIFICATION

M

2

*The Equilibrium Diagram of Cu-Zn at Low Temperatures. S. Konobejewski
and W. Taraasowa (*Physikal. Z. Sowjetunion*, 1936, 10, (3), 427-428).—[In
German.] It has been established, since 1934 (*Soc. Physics*, 1936, 5, 838
and *Z. Metallkunde*, 1936, 88, 73) that the solubility of the α-phase of the
bronze is dependent on the temperature and is much smaller at low than at
high temperatures. A corresponding result has now been established for the
solubility of the α-phase of the brass. The solubility is found to decrease
from 38·75% of zinc (by weight) at 400° C. to 33·35% at 107° C. The equili-
brium diagram of the brass in the region of the α, α + β boundary resembles,
in its concavity, the corresponding part of the equilibrium diagram of the
bronze. —J. S. G. T.

METALLURGICAL LITERATURE CLASSIFICATION

KONOBEYEVSKIY, S. T.

"Application of the Quantum Theory of Metals to Phase Equilibrium in Metals,"
Annalen der Physik ,1936, Vol 26, pp 97-115.

"The existing data on the structure and regions of stability of the phases of the
Hume-Rothery type leads to the conclusion that the phases should be considered not as
chemical compds. with definite chem. formulas but as true intermetallic phases of
variable compn. The stability of these phases is limited by the quality of the
electron gas of a given compn. that gives an energy min. with a definite crystal
structure. The free energies of solid solns. were detd. (1) through the change
in entropy in increasing in concn. of the solid soln., (2) through the increase in
energy as a consequence of the quantum conditions of the electrons of the lattice.
From the Bloch-Brillouin theory in the electrons of the lattice of the solid soln.,
the peculiar min. (thermodynamic potential) in the curve of total energy can be
calcd. The min. can be connected with the appearance of addnl. binding forces
(Hume-Rothery affinity) at definite concns. in the compound. The size of the min.
is proportional to the order of the magnitude of the thermal effects produced in
alloying the metals. The use of the theory for calcg. the course of the soly. for
the a-phrases gives results that are qualitatively in good agreement with exptl.
data. Such concns. were applied to the Cu-Sn, Ni-Sn, Cu-Be, and Sn-Cd systems.
Such calcns. permit predicting the possibility of transformations in solid solns.
alloys with variable conens. of valence electrons." Annalen der Physik, 1936,
Vol 26, pp 97-115, Application of the Quantum Theory of Metals to Phase Equilibrium
in Metals .

BC

A-1

Alteration of the atomic lattice by plastic
deformation in crystals. B. T. Kononenko
(Bull. Acad. Sci. U.R.S.S., Sér. Phys., 1937, 845).—
A summary.   I. McA.

Iz. Ak.Nauk SSSR, Ser. Fiz.

METALLURGICAL LITERATURE CLASSIFICATION

"Crystallisation in Metals by Transformation in the Solid State. S. T. Konobeevskii (*Izvest Akad Nauk S.S.S.R.* (*Bull. Acad. Sci, U.R.S.S.*), 1937, (Chim.), (5), 1309-1244).—[In Russian, with English summary.]—The crystallization theory of Gibbs and Volmer explains many aspects of phase recrystallisation. A general review of the effect is given, and results of experiments on the kinetics of the decomposition of a solid solution are recorded. The transformations take place either during a gradual change of the concentration of the solid solution or spontaneously in definite parts of the crystallites. Deformation, in the same way as a temperature increase, favours the gradual type of transformation, as it accelerates diffusion. The curves of change in hardness and lattice parameter with time caused by spontaneous decomposition consist of three sections, corresponding to incubation period, abrupt change of curve (kink), and region of congelation. As the crystallisation occurs far below the melting point, when atoms move slowly, these stages correspond to three periods: (1) that of preparation, (2) that of formation of nuclei and their growth up to the size which is in a metastable equilibrium with the supersaturated solution, and (3) that of the growth of some grains at the expense of others (congelation). M. I. Chertok's experiments show that the formation of gray tin nuclei in white tin at low temperatures takes place with over-increasing velocity. This is due to the autocatalytic effect of stresses produced by the difference of densities of the tin modifications. These stresses also account for the relatively high speed of the spontaneous transformation of tin. The speed of the spontaneous transformation is $W' = 2N'W$, l being the width of the deformation zone, N the number of nuclei per unit volume of the zone, and W the rate of linear growth of a grain. For the growth of crystals in a solid solution, the expression is derived: $a^2 = \frac{klt}{(C_\gamma - C_0)}$, where a is a measure of the crystal size, C_γ the concentration of the crystal, C_0 the initial concentration, and t the time. During the coagulation period the growth of crystals is determined not only by diffusion but also by the size of the crystal particles. K.'s and G. A. Golder's experiments show that the inter-diffusion of nickel in copper in thin layers is some hundred times quicker than the ordinary diffusion. This effect is due to a plastic deformation of copper at heating caused by the difference of the coeffs. of dilatation of nickel and copper. The anomalous change of the electric resistance associated with the precipitation is due to a change of the mean free path of the electrons and can attain several per cent. if the grain is about 10^{-6} cm. large.—N. A.

"Determination of the Limiting Solubility of the α-Phase in the Ternary System Copper-Zinc-Tin at Low Temperatures by the Method of X-Ray Analysis. S. T. Kogobeevski, V. P. Tarasova, and A. A. Stepanova (*Acta Physicochimica U.R.S.S.*, 1937, 6, (6), 799-814).—[In English.] The transformation of the solid solution of the α-phase in the copper-zinc-tin system of alloys on annealing in different initial states (after quenching, on slow cooling, and after straining) was studied. In strained samples the process of decomposition is considerably accelerated. The solid solution boundary is plotted in three isothermal sections corresponding to 500°, 350°, and 310° C.—J. S. G. T.

Diagram of state and transformations occurring in the decomposition of the α solid solution in the copper-tin alloys. S. T. KONOBEEVSKI and V. P. TARASOVA (J. Phys. Chem. Russ., 1937, 9, 691—692).—The relation of the α-phase to α + γ and α + ε has been determined by X-ray analysis. An intermediate phase ε' has been found; it is formed in the transformation γ → ε and separates from the α-solid solution above 380°; its lattice corresponds with a rhombic cell containing 32 atoms.   E. R.

PROCESSES AND PROPERTIES INDEX

BC

A-1

X-Ray determination of the solubility of the ε-phase in the ternary system copper-zinc-tin at low temperatures. E. T. KONOBREVSKI, V. P. TARASOVA, and A. A. STEPANOVA (J. Phys. Chem. Russ., 1937, 9, 693—709).—The transformation of the ε-phase on annealing has been studied in relation to previous thermal and mechanical treatment (quenching, slow cooling, deformation). The transformation is accelerated by deformation.   E. R.

A.S.M.—S.L.A   METALLURGICAL LITERATURE CLASSIFICATION

CA)

PROCESSES AND PROPERTIES INDEX

Crystallization on plastically bent rock-salt crystals.
N. T. _____ and M. P. _____'skaya. J. Expl.
Theoret. Phys. (U. S. S. R.) 8, 1308-73(1938).—When
_____ bent rock salt crystals are placed in a saturated
soln. and allowed to grow, the growing layers cling to the
curved bent and straighten it up to as much as 40%. On
being aged, from the bent the individual layers straighten
still more. Laue x-ray photographs show that the layers
consist of chemically oriented blocks of minute crystals.
P. H. Rothemann

Zhur. Eksper. Teor. Fiz.

Moscow, Sci. Res. Inst. Physics, Moscow
State Univ.

METALLURGICAL LITERATURE CLASSIFICATION

The Nature of Solid Solutions and the Inner Transformations Taking Place in Them. S. T. Konobeevski (*Sbornik Nauch. Dokladov Sektsii Metallovedeniya i Termicheskoy Obrabotki VNITO Metallurgov* (*Coll. Sci. Rep. Dir. Metal-Production and Heat-Treatment of the All-Union Scientific Engineering and Technical Society of Metallurgists*). 1940, 10-34; *Khim. Referat. Zhur.* 1941, 4, (3), 11; C. Abs. 1943, 37, 3649).—[In Russian.] The importance of X-rays in the study of solid solutions and the application of the quantum theory to metallurgy, are described briefly. The atomic structure of solid solutions, their electronic structures, and the inner transformations within solid solutions, are discussed. Diffusion in cold-deformed solid solutions is described in detail.

KONOBEYEVSKIY, S. T.

"Theory of Phase Transformations. I Thermodynamic Theory of the Phenomenon of Restoration or Reversal During the Ageing of Aluminium Copper Alloys."
Zhur. Eksper. i Teor. Fiz., 13, 6, 185-99, 1943.
Zhur.

"Theory of Phase Transformations." II. "Diffusion in Soldi Solutions Under the Influence of Distributed Tensile Stresses," Moskva Nauchno Issledovatel'skii Institut Fiziki M.G.U.)

Theoretical-mathematical. One of the possible methods of determining the weakening of the internal strains in solid solutions deformed at low temperatures as a result of diffusion is considered. A Theory of the Phenomenon is given and, from this point of view, various experimental facts are explained." Zhurnal Eksperimental'noi i Teore Teoreticheskoi Fiziki, 1943, Vol 13, No. 6, pp 200-214, Theory of Phase Transformations. II. Diffusion in Solid Solutions Under the Influence of Distributed Tensile Stresses   (Moskva Nauchno Issledovatel'skii Institute Fiziki M.G.U.).

M

Theory of phase transformations. III--Stresses Resulting from the Separation of Phases from a Solid Solution. S. T. Konobeevsky (Zhur. Eksper. Teoret. Fisiki, 1943, 13, (11/12), 418427; C Abs., 1945, 89 1098) (In Russian) Cf. ibid., (6) 185,200; Met. Abs., this vol.,p.108   The deformation and tension resulting when a spherical crystal of different composition and specific volume separates from a solid solution are calculated. In the case of the aluminium-copper system elastic" separation of phases may occur; in the case of the silver-copper system it cannot. The tensions produced set up diffusion currents that increase the rate of growth of the crystalline nuclei formed. The crystall-ization of a metal is then an auto catalytic process.

PROCESSES AND PROPERTIES INDEX

On the Theory of Substanciscus point members. H. T. Kugulevsky (*Invest. Skt. Fiziko-Khim. Anal.*, 1942, **16**, (1), 19-33).—[In Russian]. The results obtained by Haruminsky (Dissertation, 1941) in a theoretical calculation of the wave functions and energies in the ordered β-brass lattice, are given. The field of the Cu⁺ ion was obtained from the work of Hartree, while the field of the Zn⁺⁺ ion was derived by the method of interpolation. The problem can be solved only by a series of successive approximations. As a first approximation, the interaction of an electron with the field of two neighbouring atoms was considered. The wave function was sought only in the directions of the cube and octahedron, since it had been ascertained that the Schrödinger equation could be integrated in one dimension. The results of the first approximation give reasonably accurate information regarding the distribution of the valency electrons between the atoms of copper and zinc and regard-

ing the broad significance of the lattice const. of the alloy, but there is no claim that they give accurately the magnitude of the energy. A large part of the valency electrons is found in association with the zinc atoms and a small part with the copper atoms. The charges on zinc and copper are approx.: $Q_{Zn} = (-0.006-1)$, $Q_{Cu} = (+0.006-3)$. By means of a systematic survey of the boundaries of the β- and γ-phase fields in alloys of uni- and zero-valent metals in zinc and aluminium, a general law was established, viz. the constancy of the coeff. of filling of the Brillouin zone at the limiting saturation of the phase. An explanation is given of the existence of " defect " lattices (formation of vacant sites in the lattice) from the point of view of Jones's theory. (General thermodynamic considerations permit a relationship to be established between the dependence of the thermodynamic potential on concentration and the course of the boundary of a solid solution. Comparison of calculated with experimental data for a solid solutions of copper shows that an extra minimum exists on the thermodynamic-potential curve; this can be explained by the electron theory of solid solutions.—N. A.

KONOBEYEVSKIY, S.T.

"A Thermodynamical Theory of Restoration Phenomena in the Aging of Cu-Al Alloys," Journal of the Institute of Metals, 1943, Vol 69, pp 397-413.

"The high dispersion of $Cu-Al_2$ permits a metastable equilibrium in slightly supersaturated solns. Restoration results from resoln. of $CuAl_2$ in increase of temp. Dimensions of equil. nuclei are independent of the total concn; the number of pptd. crystals depends upon initial concn. of the solid soln. since this concn. dets. crit. magnitude of the nucleus and energy of formation of the phase. Dimensions of the equil. crystal found during normal aging are diam. 2r 10^{-7} cm. and thickness d 3 x 10^{-8} cm. In the 5 and 2% Cu alloys the number of crystals in the pptd. phase is 1.3 x 10^{20} and 0.5 x 10^{20} per g., resp. Specific surface energy is 0 = 0.75 x 10^{-5} cal. per sq. cm." Journal of the Institute of Metals, 1943, Vol 69, pp 397-413, A Thermodynamical Theory of Restoration Phenomena in the Aging of Cu-Al Alloys.

Theory of the Structure of Intermetallic Phases of Variable Composition.
S. T. Konobeevsky (*Uchen. Zapiski Moskov Ordena Lenina Gosudarst. Univ.
M.V. Lomonosova*, 1944. [Fiz.], **74**, 13-36; *C. Abs.*, 1945, **39**, 2918).—[In
Russian.] In solid solutions of metals the condition must be fulfilled that
the wave functions of the external electrons have finite values within the
whole lattice. From this condition it is deduced that the max. number of
electrons in an elementary cell is determined by the shape and structure
factor of the Brillouin zone. In the alloys of zinc with copper, silver, and
nickel, and of aluminium with nickel and cobalt, the max. concentration of
zinc or aluminium in the homogeneous β-phase is given by the condition
$n = 3$, n being the number of electrons in the cell. The homogeneous γ (or
Γ or δ) phases in the alloys of zinc with copper, silver, gold, iron, cobalt,
nickel, and manganese, and of aluminium with copper, gold, nickel, cobalt,
and chromium have $n = 3.27$ (i.e., $n = 88$ for the large cell of about 52 atoms).
When the number of electrons per atom is $= 1.50$ for the β-phase and $= 1.70$
for the γ-phase, the constancy of n is reached by reducing the number of
atoms in the elementary cell, e.g., to 1·67 in Ni_5Al_3 (β-phase) or to 48 in the
δ-phase of iron-zinc alloys. In copper-nickel-aluminium alloys copper atoms
must have no valency electrons: otherwise n in the β-phase would be
$= 3$.

ASM-SLA   METALLURGICAL LITERATURE CLASSIFICATION

PROCESSES AND PROPERTIES INDEX

On Some New Problems in X-Ray Structure Analysis. S. T. Konobeevsky (*Izvest. Akad. Nauk S.S.R.*, 1946, [Fiz.], 10, (4), 371–379).—[In Russian]. In a review based on his own work, K. discusses the thermal scattering of X-rays, the calculation of the dimensions of the Guinier–Preston zones for the S' phase precipitated from the solid solution of copper and magnesium in aluminium ($L_1 \simeq 7 \times 10^{-6}$, $L_2 \simeq 30 \times 10^{-6}$, $L_3 > 100 \times 10^{-6}$ cm.), and the treatment of an X-ray photograph as the energy spectrum of a crystal.—N. A.

METALLURGICAL LITERATURE CLASSIFICATION

KONOBEYEVSKIY, S.T.

A CONTRIBUTION TO THE MECHANISM OF CONDENSING METALS (ZINC, CADMIUM, MAGNAESIUM, AND BERYLLIUM) FROM VAPOURS. S. KONOBEESKY AND M. UMANSKY (J. PHYSICS (U.S.S.R.) 1946, 10 (4) 388) (In English) Thin layers of zinc, cadmium, magnesium, and beryllium, produced by condensation in vacuo, exhibit orientations varying over the surface accordin to the angle of incidence of the molecular beam. For a normally incident team of zinc a toms, an axially symmetrical texture is formed; the hexagonal axis of the zinc crystal is normal to the surface. For oblique beams, the (100) plane coincides with the plane passing through the direction of the beam and that of the normal to the surface. The hexagnoal axis lies in this plane. It is suggested that crystalline nuclei are form ed before contact is made with the surface upon which the metal is condensed. GVR